

Robocup Soccer

Project specification

Introduction

RoboCup Soccer Simulation is a soccer simulation game where the teams consist of players controlled by autonomous software programs. The programs communicate with a central server that handles the current state of the game, including the position of the ball and all players, as well as physics and other necessary components. The player programs receive this as sensory input, which forms the decisions they make. Aside from successfully tuning the players to execute a collective strategy, the big challenge with RoboCup Soccer is to be able to quickly determine what action needs to be taken from all the different game states that exist.

RoboCup Soccer has provided much research in the field of artificial intelligence and team strategy, and also has led to many surprising technological advances. It is an relatively easy entry point to the field of AI and we think it will be a fun experience to try it out. Hopefully we can play a small part in RoboCup Soccer's goal of winning with a robot soccer team over last year's human champions in year 2050.

Problem statement

We intend to implement a complete RoboCup Soccer Simulation team, as advanced as possible considering the time restriction on hand.

Many problems arise when trying to create an optimal soccer team. A lot of team strategies exist, and some are most of the time better than others. The success of a specific strategy implementation may also vary on opposing teams choice of game strategy. The robocup soccer server also runs in discrete time and every agent(player) on the team must make a decision within 100ms. This creates a huge constraint on the level of detail in the decision making of each agent and needs to be solved in the best way possible, or at least on an acceptable level.

When implementing a team strategy we must decide on what choices are a necessity for success and what we can't include due to the constraint on our limited time frame but also on a technical aspect. During this project we want to research further into commonly used strategies that have been successful in the past and implement one or some of these in our own team. Possibly we would like to mix different aspects of different team strategies to hopefully create an ever better soccer team.

Approach

To succeed with this project we must first study and analyse different strategy approaches that already have been developed. Secondly we need to break down the strategies we are interested in to see if we can mix the different strategies and pick out the strategic decisions we think are “smart” and create our own hybrid-strategy. We must also consider if it is possible to mix different decision making algorithms and if they will yield a good outcome. Lastly we also need to solve the practical problem of implementing our ideas in a computer program that can communicate our developed team strategy to the robocup soccer server. This can present a challenge due to technical constraints and the fact that the server runs in discrete time.

References

RoboCup Soccer official webpage.

<http://www.robocup.org/robocup-soccer/simulation/>

Torie Bosch, *Why You Should Care About RoboCup* (2012)

http://www.slate.com/articles/technology/future_tense/2012/06/robocup_2012_how_robot_soccer_has_led_to_robotics_breakthroughs_.html

Sébastien Lentz, *Design of intelligent agents for the soccer game* (2010)

<http://sebbot.googlecode.com/files/master-thesis.pdf>

Time plan

Task name	Start date	End date
Research	2013-02-04	2013-02-18
Write background	2013-02-18	2013-02-25
Write problem statement	2013-02-25	2013-03-04
Write implementation strategies	2013-03-04	2013-03-11
Write analysis and results	2013-03-25	2013-04-08
Write conclusion	2013-04-01	2013-04-15
Write introduction part	2013-04-08	2013-04-12
Planning team implementation phase and writing psuedo code	2013-02-25	2013-03-04
Code implementation	2013-03-04	2013-03-25
Review of other essay	2013-04-15	2013-04-22